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AN

INAUGURAL ESSAY

ON

HYDROCELE,

FOR THE DEGREE OF DOCTOR OF PHYSICK:

Submitted to the consideration

OF

THE HON. ROBERT SMITH, PROVOST.

AND OF THE REGENTS,

OF THE

University of Maryland.

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Phœbe fave! novus ingreditur tua templa sacerdos.....*Tibullus.*

BALTIMORE:PRINTED BY RALPH W. POMEROY, & CO.
NO. 12, LIGHT STREET.

1815.

Necessitas urget non cacæthes scribendi.

THE term *hydrocele*, is applied by surgeons to that species of swelling formed by the accumulation of an aqueous fluid, within the coverings of the testis. There are several varieties of the disease, each designated according to its particular situation; it is proposed, however, in the following pages, to treat only of the hydrocele of the tunica vaginalis testis.

HISTORY.

There is no period of life exempt from the attacks of this disease; the young, the middle aged, and the old, are equally liable to it. The healthy, the infirm, the athletick, the bacchanalian, and the abstemious, may be afflicted by it.

The disease commences in the form of a small tumour, which usually occupies the lower part of the scrotum, and seems to arise from the testis itself. The tumour is generally of an oval shape, the largest diameter being placed downwards. In proportion as the swelling increases in size, it becomes, rounder, and occasionally it is divided into one, or more lobes. The disease, however, may exist for a great number of years, and yet the tumour retain its pyramidal figure. In some cases the membranes are very much stretched, and the scrotum increases to an enormous size, reaching almost to the knees.

The patient seldom experiences any pain or uneasiness; the weight and dragging of the tumour sometimes, however is productive of considerable pain, particularly in the loins. In the commencement of hydrocele the swelling is generally soft and fluctuating, but in the advanced stages of the disease it is tense and elastic, and feels like a bladder distended with water. The tumour has sometimes a stony hardness; two or three cases of this kind occurred to doctor Gibson in which he found it difficult to determine whether the disease was *hydrocele*, or *sarcocele*. Instances of a similar nature are mentioned by Schmucher. In such cases the tunica vaginalis testis has generally been much indurated and thickened. Such are the general symptoms attendant on hydrocele, others shall be more particularly noticed when we come to point out the diagnostick signs.

CAUSES.

It is a very difficult matter, and perhaps impossible, to account in a satisfactory manner for the production of hydrocele. The causes of the disease have upon all hands been allowed to be very obscure, and by no means understood. The celebrated surgeon Ruisch attributed the complaint to a varicose state of the spermatic cord; it has been amply demonstrated, however, since the time of Ruisch, that the disease frequently occurs without any preceding or concomitant affection of the cord; and it has been remarked by Mr. Pott, that although it was difficult to say, whether or not there was any foundation, for such an opinion, yet that in all probability, a varicose enlargement of the spermatic cord, was to be considered as an effect of hydrocele rather than a cause. The exciting causes of hydrocele are sometimes evident; thus the complaint has been speedily induced by a blow on the

testis; sometimes the disease arises from the pressure of an ill-formed truss; at other times it has been brought about by the application of cold. Richter relates several cases in which a hydrocele arose in three or four days after the patient had been exposed to immoderate cold. A hydrocele has sometimes been known to arise from a schirrous state of the testicle. This combination constitutes the disease denominated by authors *Hydrosarcocele*.*

A late writer, Mr. Ramsden of London, in his "practical observations on scerocele" has endeavoured to prove that hydrocele is dependent in many instances upon excitement in the urethra. In order to give a clear conception of Mr. Ramsden's ideas on this interesting subject I shall make one or two extracts from his work, "I am induced, says Mr. Ramsden, to offer this opinion from a variety of facts, which have presented themselves to my observation, and which lead me to suspect, that in almost every case of true hydrocele, the urethra will be found either to have been exposed at some previous time to excitement, or inflammation, or to be in a present state of increased sensation, from constitutional irritability, from the membranous fence, or from some other of the several general or local causes to which I have in the preceding pages, referred the derangement of this membrane."

"The prevalence of hydrocele in the East or West Indies, instead of being attributable to the relaxation of the climate, may more reasonably be referred to the constant excitement to which the urethra is exposed from the habits of the table; since it is well known that in those hot countries, every individual indulges in high seasoned

* Dr. Gibson was called last winter to Upper Marlborough to extract a schirrous testicle. The testicle was found to be of very large size, and the tunica vaginalis, contained upwards of a quart of water. (Lect. on surg.)

dishes and in the most stimulating description of diet." We have not experience enough to determine whether the positions of Mr. Ramsden are well founded or not, but his opinions are at least ingenious and plausible, and from his well known reputation and standing in the profession, we do not feel disposed to question his authority, but on the contrary are inclined rather, to go along with him in his explanations. Future observation can alone determine the true causes of the complaint, and the day we hope is not far distant, when these will be satisfactorily revealed.

DIAGNOSIS.

As hydrocele is liable to be confounded with other complaints, it will become necessary in the next place, to advert to the diagnostick marks. The principal diseases that bear a resemblance to hydrocele, are hydrops scroti, Oscheochele or serotal rupture, and sareocele, or schirrous testicle.

Hydrops scroti is an œdematous enlargement of the scrotum. It is usually the symptom of some constitutional disease, as of ascites or anasarca. It may generally be distinguished from hydrocele by the uniform enlargement and by the smoothness and shining aspect of the whole scrotum. In hydrocele on the contrary, the swelling usually occupies one side of the scrotum, and the rugæ are always more or less conspicuous. If the finger be pressed upon hydrocele, no impression or pit is left; but if pressure be applied to hydrops scroti, the integuments yield and a dimple remains for some time after the pressure is removed.

Hydrocele has frequently been mistaken for the reducible scrotal hernia. By attending to the following cir-

cumstances, however, each disease may generally be discriminated. In hydrocele, the tumour commences in the bottom of the scrotum and gradually ascends, but in hernia the swelling is first observed at the abdominal ring and in the course of time falls into the scrotum. In hydrocele the spermatick cord may usually be felt at the upper part of the scrotum, as may also frequently the testicle; the most common position of which last, is near the middle and posterior part of the tumour. In hernia the spermatick cord can seldom be felt, owing to its being generally situated on the posterior part of the hernial sac.

Again, in the reducible hernia, the gut ascends into the abdomen, whenever the patient is placed in the recumbent posture; in hydrocele, on the contrary, no change takes place in the size or situation of the tumour, by varying the position of the patient. In hernia if the patient be directed to cough an impulse is communicated to the hand of the surgeon. In hydrocele no such sensation occurs.

Lastly, hydrocele may frequently be distinguished from hernia, by the transparency of the tumour. Thus if the patient be placed in a dark room, and a lighted candle be held on one side of the swelling, in many cases, and almost always in children an evident transparency may be observed. It must be remarked however, that this is not an infallible criterion, for frequently the membranous coverings are so much thickened that it is impossible to discover the existence of a fluid.

An attentive observer may in general, without much difficulty, distinguish between hydrocele, and saccocoele. In the latter disease the swelling is from the first, for the most part uniform, and does not occupy any particular part of the scrotum. The schirrous testicle is much

more solid and heavier than the hydrocele, it is also more painful to the touch; when pressure is applied to hydrocele more or less of elasticity and fluctuation may be discovered; the sehirrous testicle on the contrary, is firm and unyielding. It seldom happens that every part of the testis is equally indurated; some parts being softer than others; but in hydrocele the same feeling exists at every point, except at the posterior part, where the testis is situated. If pressure be made on this part the patient experiences acute pain. In sareocele the same kind of feeling exists throughout the tumour, and every part suffers alike from pressure. As a further distinction between hydrocele and sareocele, it may be remarked, that in a diseased testis we generally meet with a varicose state of the vessels, and an irregularity on the surface of the tumour, both of which are foreign to the character of hydrocele. It sometimes happens as we have already had occasion to observe, that hydrocele and sareocele are conjoined, constituting the disease, called hydrosareocele; in such cases the diagnosis will become more difficult, but in general some sense of fluctuation will be discovered.

Believing that we have now described the most prominent and characteristick symptoms of hydrocele, which to use the language of sir James Earle, "though not a painful complaint is obstructive to the exertions of the indigent and laborious, a considerable impediment to the active pleasures of the opulent, and is found to be so unseemly, inconvenient and troublesome by all, as to demand the assistance of surgery," we shall in the next place enumerate the different means which have been resorted to for its removal.

CURE.

Although surgeons have generally depended upon an operation, for the cure of hydrocele yet it will be proper to mention, previous to entering upon a history of the several methods employed, that the complaint according to writers, has sometimes been removed both by internal medicines and by local applications. We are told by Mr. Warner, that he has frequently succeeded in curing the Hydrocele in young persons by means of purgative medicines and by the use of stimulating astringents applied to the part. Emeticks have also it is said, caused the complaint to disappear in a very short time. Schmucher has sometimes removed a hydrocele by fumigating the scrotum with vinegar every morning and evening. Of late years, Mr. Keate, of London has particularly drawn the attention of the profession to a remedy by which he asserts he has frequently and repeatedly dispersed the hydrocele. This consists of powdered sal ammoniack, vinegar and rectified spirits of wine mixed together. Compresses wet with this lotion, are to be applied to the scrotum three times a day, and there retained by a bag truss. It is necessary according to Mr. Keate, that this practice be continued at least a month in order to accomplish a cure. Sir James Earl has in several instances tried Mr. Keate's plan, and from experience is induced to declare, that although successful sometimes, yet in the majority of cases the remedy is not to be depended on.

Issues have been recommended by some authors as a means of curing hydrocele and Morand in particular relates several cases in proof of their efficacy: Douglas also says he has cured many patients of the complaint by placing an issue near the groin.

Mr. Ramsden in his work on *sclerocele* to which we have already had occasion to refer, has proposed the use of the bougie as a remedy for hydrocele. He remarks however, that it is only in the acute and spurious forms of hydrocele, that much benefit is to be expected from this instrument. In the chronick hydrocele little or no good is derived from its application. Mr. Ramsden asserts from his own experience, that many cases of hydrocele have been entirely cured by bougies, after all the internal medicines, and local applications above mentioned had been tried without effect.

Two operations have been in use for the cure of hydrocele, the one termed *palliative* the other *radical*, of each of these it will be proper to give a short account.

In the *palliative operation* the object of the surgeon is simply to evacuate the water, by which the patient is for a time relieved of his complaint, the water however again accumulates and subjects him to the same inconvenience. In the *radical operation* the design of the surgeon is to excite such a degree of inflammation, as will cause an adhesion of the tunica vaginalis to the tunica albuginea, and thus by preventing a reproduction of the fluid, effect a permanent cure. There are certain cases in which the one operation should be preferred to the other. If the hydrocele should be exceedingly large, it will not be safe to excite such a degree of inflammation as may be necessary to the cure, and again there is not so great a probability of success attending the radical operation. If along with the hydrocele there should be a diseased testis, it will be proper to have recourse only to the *palliative operation*. The *radical operation* in such a case would perhaps induce a malignant change in the testicle. When it is determined on to perform the *palliative operation*, it may be done either with the common

laneet or the trochar. The latter instrument I should prefer to any other, were it only for this simple reason, that the water by passing through a cannula has a more ready exit, and is not so apt to find its way into the cellular membrane of the scrotum, as when the laneet is employed. The pain occasioned by either instrument is very trifling. In the introduction, care should be taken that the instrument be carried almost in a perpendicular direction from the bottom of the tumour; if it were thrust in horizontally, there would be some risk of wounding the testis. After the evacuation of the water, the orifice should be covered with a bit of sticking plaster and the scrotum supported by a bag truss.

For the radical cure of hydrocele, six principal operations have been recommended. The *incision*, the *excision*, the *caustick*, the *tent*, the *seton*, and *injections*.

THE INCISION.

The operation by incision for the cure of hydrocele is the most ancient of all, and was first described by Celsus. The intention of the operation was to lay open the integuments of the scrotum, and the tunica vaginalis throughout their whole extent, in order to discharge the water and to excite such a degree of inflammation as to prevent its regeneration. The operation was generally performed by the common bistoury, which was introduced into the upper part of the scrotum, guided by the finger of the surgeon. The incision was commenced at the upper part of the scrotum with a view of preventing the sudden escape of the fluid, which could hardly fail to happen if otherwise performed. The operation by incision is now entirely abandoned, both on account of the ill consequences, which have sometimes resulted from it, as of the

want of success in many instances attending it. Acrell Monro, Sabatier, Bertrandi, Richter and sir James Earle all speak of its disadvantages and dangers.

EXCISION.

Although the operation of excision is spoken of by Celsus and by Galen, yet it would appear that *Albucasis* was the first author who described it in a correct manner. When the surgeon undertakes this operation, it is with a view of removing entirely the tunica vaginalis testis, and of exciting thereby a high degree of inflammation. In cases of Hydrocele where the tunica vaginalis was preternaturally thickened it was supposed that the operation of excision was the only one that could be used with advantage; accordingly it has occasionally been recommended and practised even by some of the most celebrated modern surgeons, as Douglas, White, Gooch, Saviard and Louis. It is our decided opinion however, notwithstanding the high authorities mentioned, that this operation, in its nature so necessarily formidable, should never be resorted to unless every other method should have previously failed.

CAUSTICK.

The caustick was introduced as a cure for hydrocele by Paulus Ceginita, and maintained its ground for a considerable time. It was however, at last abandoned, in consequence of the violent symptoms which sometimes followed its use. It was revived in modern practice by Mr. Acrell and Mr. Else. The object of the surgeon in the application of the caustick, was to excite the necessary degree of inflammatory action and to effect this the kali

purum was generally used, mixed with quicklime and formed into a paste. The caustick was suffered to remain on the part six or seven hours. In the course of a few days the eschar dropped off and left an ulcerated surface. Frequently it became necessary to detach the slough by the knife and afterwards to puncture the tunica vaginalis.

TENT.

The method of curing hydrocele by the tent, was practised for a great length of time by the most eminent surgeons. It was first recommended in the writings of Franco. An opening should be made in the integuments and tunica vaginalis, about an inch and a half in length, the water evacuated, and a tent of sponge, of linen, or lint, introduced. The tent should have a ligature attached to it, and be not less than an inch in length, a new tent should be introduced every day, and be continued until a cure is completed.

SETON.

The seton was first employed in practice by Guido de Canliaco, and since his time has been in very general use. The distinguished Mr. Pott preferred this method to every other, and has left some very valuable observations concerning the manner of conducting the operation. The instruments used by Mr. Pott consisted first, of a trochar, to which is attached a cannula about a quarter of an inch wide. Secondly, of another cannula, called the seton cannula five inches long, and just large enough to pass with ease through the cannula of the trochar. Thirdly, of a probe having at one extremity an *eye*, and

at the other a sharp steel point. The seton is made of as much white sewing silk as will readily fill the cannula.

In performing the operation, the trochar is first introduced into the lower and anterior part of the tumour, and the water evacuated. The seton cannula is next passed through the cannula of the trochar, and made to press upon the tunica vaginalis at the upper part of the tumour. Lastly, the seton needle armed with the silk, is to be conveyed through the seton cannula, and made to pierce the scrotum from within outwards at that part, which is in contact with the cannula. The silk being introduced through the tumour, the cannula's are withdrawn and the operation completed.

It commonly happens that the inflammation subsides about the tenth or twelfth day; the seton is then to be gradually withdrawn, and this is best accomplished, by taking away only a few threads at a time.

Some surgeons have condemned in unqualified terms the use of the seton in the cure of hydrocele, while others have extolled its advantages above all other methods; in particular, Mr. Pott is induced to consider it as the mildest and most certain means of effecting a cure. We have no doubt but that the seton in many instances, will answer the expectation of the surgeon completely; but on the other hand we have reasons to believe, that it is sometimes productive of unpleasant effects; next to the operation by injection, however, we should certainly feel disposed to give it the preference.

Having thus, as proposed, given a cursory view of the first five operations mentioned, it will be proper in the next place, to treat of the sixth and last operation, viz. that in which the cure is completed by *injection*.

INJECTION.

An army surgeon by the name of Monro, was the first who used injections for the cure of hydrocele. In the first case that occurred, he tried spirits of wine, the inflammation however, was so violent that he was induced afterwards to employ common Port or Madeira wine.

Mr. Sharp in his work on the *operations of surgery* says, that he also attempted the cure of hydrocele by spirits of wine, but the inflammation which followed was so great as to incline him to abandon the operation. From this time it would appear that injections were but little used in England; on the continent of Europe however, and particularly in France, as we learn from Sabatiers, treatise, they were very generally and very successfully employed.

Of late years the practice by injection has been revived in Great Britain, and for this the publick are indebted almost solely to sir James Earle.

Sir James Earle had frequently succeeded in procuring an adhesion and consolidation of parts in sinuses and other large cavities, by injections of various kinds, without causing great inflammation, and was from hence induced to conclude that hydrocele might be cured by the same gentle means; without deranging in any great degree, the tender and sensible organs which are the seat of the disease. "I was determined (says this celebrated practitioner,) to make the experiment, and the injection which after some consideration I had fixed on for the purpose, was wine, which I made choice of for several reasons. I found that it had been used with success in France, I had experienced it to answer well in procuring adhesion in other parts. The strength of wine is never

so great, as to render it an unsafe remedy and it may be readily lowered, according to the different sensibility of the parts. Thus a vinous injection appeared capable of producing all the good effects which could be desired, with scarce a possibility of doing harm. The success which has attended it has more than answered my expectations and from every trial which I have made, I have no reason to wish for a different one. The pain which is produced is incomparably less than by any other operation; it does nothing more than is intended and the curative effect, as far as my experiments have gone, is equally certain."

Since sir James Earle's remarks in his editions of Mr. Potts' works, and in his treatise on hydrocele were published, the use of injection has become very general not only in Great Britain but in other countries, so that the operation may be considered as now established, and as having superseded every other method. Even Mr. Pott, who in his writings has shewn so much partiality to the seton, and who in speaking of injections, considers them as remedies "which happily for mankind were laid aside," lived to express his decided approbation of the method, and to declare that his apprehensions were totally unfounded.

After these preliminary remarks we shall next proceed to describe the manner of conducting the operation. The patient is to be placed on a table of convenient height, or on a bed, with the knees bent on the thighs and the thighs on the pelvis. The operator is seated before the patient and having fixed upon the most prominent part of the tumour, thrusts a trochar through the integuments and tunica vaginalis so as to evacuate the water which passes out through the cannula of the trochar. The bag being empty, the nozzle of a syringe is fitted to the cannula and

an injection consisting of two parts of port wine to one of water, is thrown into the cavity, where it is suffered to remain for two, five or seven minutes, according to the degree of pain produced, and then permitted to flow out through the cannula. The patient sometimes feels an acute and violent pain, darting up the abdomen in the direction of the cord; when this is the case the wine and water should be immediately evacuated, and an opiate administered.

In two or three days after the operation, the requisite degree of inflammation is produced, the tunica vaginalis adheres to the albuginea and a radical cure is established in the course of a short time.

Instead of using a trochar and cannula in the operation, some of the English surgeons direct that an opening be made into the scrotum by a common lancet or scalpel, and that a catheter or cannula be afterwards introduced to draw off the water. This however is an awkward and painful operation and should on no account be imitated. It has sometimes happened that owing to inattention, the cannula has slipped out of the opening in the tunica vaginalis, immediately after the evacuation of the water, so that its end became situated in the cellular membrane. The surgeon should be aware of this circumstance, otherwise in throwing in the injection, this fluid will pass into the cellular membrane of the scrotum instead of the cavity of the tunica vaginalis and produce the worst consequences, such as abscesses, sinuses, and sloughing, to the greatest extent. Mr. Charles Bell in his *operative surgery* while speaking on this subject observes, "one day while I was accompanying a celebrated surgeon to the house of a patient, on whom he was about to perform this operation, I took occasion to remark to him this danger. He said that he could not conceive it should happen and that he

had performed the operation thirty times, without such an accident having occurred. But in performing the operation that day, the very thing happened; a large proportion of the fluid got into the cellular membrane. I had not therefore, to convince him that it was possible, but how it happened."

I cannot avoid further remarking, that the great advantage which injections possess over the other methods for the cure of hydrocele, is that when thrown into the cavity, they apply themselves equally and universally to every part and can when necessary, be easily and wholly discharged.

Before I conclude this dissertation, I propose to make a few remarks on a variety of hydrocele, which is very seldom met with, but which when it does occur, may give to the unexperienced surgeon considerable trouble if the nature of the case be not understood. This variety of hydrocele was mentioned to me by Dr. Gibson our professor of surgery to whom I am indebted, for an interesting case, which I shall presently detail.

Instead of the tunica vaginalis being filled with water in the ordinary manner septæ or partitions intersect the tumour in different directions, forming sacculi, each containing a fluid in consistence and colour like that of the common hydrocele. The whole cavity is filled with these bags which appear to be distinct and separate from each other. They resemble very much the hydatids found in the uterus, liver, and other parts of the body.

CASE.

H. H. a young lad about eighteen years of age, was brought into the City Hospital in 1812, and placed under the care of Dr. Gibson, for the cure of a swelling in the

scrotum. Upon examination, a tumour was discovered to occupy the right side of the scrotum, was of considerable size, and divided into three lobes. It was of pretty solid consistence, but a fluctuation at some particular parts was very evident. The general resemblance however, it bore to hydrocele was sufficient to induce the surgeon to attempt an operation. A trochar was accordingly thrust into the scrotum, and upon being withdrawn a small portion of water escaped. The tumour still retaining nearly its original size, it was thought expedient to enlarge the opening made by the trochar; the bistoury was accordingly introduced, and an incision about an inch in length, was made through the integuments and tunica vaginalis, when a transparent cyst or bladder, was immediately presented at the wound. This, which was fixed by a narrow neck, being removed with the scissors; a second bag in every respect like the first, occupied its place. Several other bags in succession appeared, as soon as the one which filled up the space was removed, and these in like manner were taken away until the whole cavity seemed to be empty. An injection composed of port wine and water was then thrown into the tunica vaginalis and the patient was put to bed. A considerable inflammation supervened, which terminated in suppuration, and during this process several small cysts filled with the transparent water were again discharged. The scrotum after this gradually assumed its natural size and in the course of four weeks the patient entirely recovered.

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